

~~TOP SECRET~~
~~TOP SECRET~~

GUS-0087/B

25 May 1959

MEMORANDUM FOR THE RECORD

SUBJECT: "Follow-On" Operational Considerations

1. Evaluation criteria for the "follow-on" vehicle are based on the operational considerations listed below.

2. The primary consideration is survival. It is felt that the most important factors contributing to survivability are detection; altitude; time/speed; and tactics.

a. Detection:

(1) The design of the vehicle in terms of size and/or radar reflectivity should be such that it will avoid detection. The characteristics should be such that detection of the vehicle will be unlikely at all altitudes.

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(3) The performance of the vehicle should be such that it will allow for maximum exploitation of any weakness in the enemy detection system and/or air defense system.

b. Altitude:

(1) As reflective area increases, the altitude must increase in order to avoid detection. Ability to fly at altitudes above the effective ceiling of known defensive weapon capabilities will counterbalance any future significant improvements in the Russian defensive system, including infra-red, and speed differential.

c. Time/speed:

(1) The effectiveness of any air defense system is directly related to reaction time. The greater the speed, the less time there is available for tracking, identification, command reaction and intercept.

d. Tactics:

(1) The ability to plan and/or program evasive action in order to degrade the air defense system should be available; that is, random changes in flight altitude and heading.

~~TOP SECRET~~

TOP SECRET

- 2 -

(2) The ability to program a non-linear flight path would give the additional advantage of obtaining maximum mission effectiveness in terms of target coverage.

(3) The ability to fly directly over heavily defended areas and radar sites should be available in order to:

- (a) Present the smallest reflective area to the radar/
- (b) Take advantage of any radar dead zone.
- (c) Reduce the time under surveillance.
- (d) Confuse and deceive a specific radar. (Flights which have been conducted in congested areas have necessitated that the area be cleared in order to maintain positive scope identification.)

3. The next consideration, equally as important as the first, is operational utilization. Factors affecting and/or considered as pertains to operational utilization are exposure and operational employment.

a. Exposure:

(1) The number of knowledgeable persons must be kept to an absolute minimum. Speculation by friendly forces, controversial discussions concerning minor aspects of the program, particularly during the early phase, dependence on overseas bases and political approval to operate are factors that affect sortie rate and areas of operation. Under a given set of conditions, a combination of the above could result in political disfavor, program cancellation, and/or extended stand-down periods. Therefore, the ability to operate from one permanent ZI base and utilize a Navy aircraft carrier for recovery is desired.

(2) The capability to post strike on an aircraft carrier or any established USAF ZI base is considered to offer the least security risk. It is felt that in the future, the number of US controlled air bases overseas will be reduced drastically. In any event, the political trend is such that base availability should not be relied on. As pertains to post strike overseas bases which are available, the ability to expeditiously retrieve the vehicle, dismantle it and return it to home base is required.

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(4) Additional considerations are; experience gained to date as pertains to obtaining political approval, the cost of

TOP SECRET

TOP SECRET

- 3 -

the program, indicating that every precaution should be taken to insure maximum utilization and effectiveness, and the minimal possibilities of a protest by denying the enemy all information as pertains to point of origin, destination, and association.

b. Operational employment: The next consideration of importance is that of mission effectiveness. Factors contributing to effectiveness are; timeliness, maneuverability, system availability, navigation system, crew fatigue, escape system, availability, growth potential, maintenance and training.

(1) Timeliness: The ability to obtain the desired type of information and reduce it to a useable form on a timely basis, particularly during times of tension, is most important. The ability to perform missions on a 12, 6, and 4 hour basis after an initial 24 hour alert, is required. This requirement also exists for successful accomplishment of emergency evacuation plans. The aircraft turn-around time should be 2-3 hours maximum and, when dismantled, should fit into existing and/or

(2) System availability:

(a) Development and availability of airborne primary mission capabilities and ground data reduction equipments must be compatible with the increased performance of the vehicle, and consistent with the operational readiness date of the vehicle.

(b) Past experience indicates that available space and weight in the vehicle will be a problem. Sufficient space and weight must be made available in the initial design phases to insure that future compromises will not detract from or degrade the quality of the end results. New equipments usually require more space and are heavier than expected, again indicating the need for adequate space and weight provisions in the initial design phases.

(c) New sensors to allow for night and bad weather operations should be considered.

Photo, ELINT, and high resolution radar types of sensors are felt to be next in importance.

(3) Navigation system: Mach 3 speeds and polar routes necessitate utilization of some form of guidance system. Presently used navigation equipment is inadequate.

TOP SECRET

TOP SECRET

- 4 -

(4) Crew fatigue: Weight limits the crew to one man. Due to added work loads and inherent dangers, adequate provision must be made for ventilation, temperature control, simplicity and reliability of operation. All known factors contributing to fatigue should be adequately provided for in order to allow the pilot to devote full attention to mission accomplishment.

(5) Escape system: Primary consideration should be given to a capsule type cockpit for safe exit. However, minimum acceptable would be a full pressure, high altitude suit arrangement with a tumble free ejection seat.

(6) Availability: Desired, early 1960. Required operationally ready, 1961.

(7) Growth potential: Airframe design should allow for growth potential in the power plant, load carrying capability, and range. Although no growth is anticipated for the first two years, design should allow for increased performance during the 1963-1965 time period. If this is not feasible, planning should be such to provide a successor to the follow-on vehicle that will meet the requirements of the time period involved (para 4 below).

(8) Training: The need for a minimum training syllabus is desired. Utilization of available service pilots is required. The aircraft should accommodate and utilize as much of the presently available and proven equipments and instruments as feasible.

25X1D

- 5 -

c. Tracking: As pertains to a Mach 3 vehicle at 90,000 feet, the following applies. The proposed vehicle will be detected by radar, identified as hostile, and will be tracked the majority of the route over the USSR. The missing tracks will probably be filled in by the investigation in areas where the sonic boom is prevalent. There is also the possibility of the development of an advanced type of detection, i. e., infra-red or Krug, that will further add to the efficiency of the track.

d. Reaction: The defensive effort will be as extensive as possible to destroy the vehicle. Against fighter intercept attempts, the altitude and speed of the vehicle will exceed that of the fighters. This factor, combined with limited reaction time, makes successful intercept negligible, even with air-to-air missiles. It is expected that the certain areas that are defended by surface-to-air missiles should be avoided. The state of the art developments and SAM indicate that the early period will have a limited capability that will grow in magnitude and be a serious threat to survival during the later period. It is recommended, therefore, that tests and/or modifications that will delay the operational date or restrict performance be viewed in this light.

e. Political considerations: It appears certain that by a single means or combination of radar, sonic boom, ionization, and infra-red, the vehicle will be detected and identified as intruder. As such, it must be expected that protests may be evoked from the USSR. However, this will require firm knowledge of the responsible country and not simply one of suspect, and the following considerations must be fully exploited:

(1) Security - Though high standards have been set in the past, they must be improved in order to allow full utilization of the collection device. The single base concept in the ZI offers not only a chance for greater security, but also does not require the utilization of bases in foreign countries which could be subject to Soviet pressure. It appears relevant to add in light of the above, that a political conditioning factor for the full utilization of the vehicle must be more fully exploited than those undertaken for CHALICE. In retrospect, it seems unrealistic when a collection device that has immunity is not utilized to guide events of the state and national defense in years of increased tension and threat to national survival. The present Soviet government does not view overflights as a threat of war. The spy rings of the USSR exposed in the US would indicate an extremely active collection agency. The USSR recognizes her relative immunity from these sources and identifies the overflight program as a reconnaissance vehicle.

5. Intelligence Qualitative Requirements: Responsibilities to the National Security, criteria for job to be done; timeliness and major threats are the primary considerations.

~~TOP SECRET~~

~~TOP SECRET~~

- 6 -

a. Responsibilities to the National Security: Priority requirements will be based on the operation agency's responsibilities as pertains to the National Security. Secondary requirements will be based on the operation agency's responsibilities to other national agencies such as the Department of Defense, National Security Agency, Department of State, etc.

b. Criteria for the job to be done: The operating agency's responsibilities are to provide adequate, timely and reliable intelligence information to the Executive Branch of the government for use in the following situations:

(1) Threat against the US from a foreign government.

(2) For the security of the US, its possessions and areas of vital interest.

(3) The advancement of national policies and other interests of the US.

(4) The internal security of the US.

(5) Government sponsored research and development programs. The development of tactics, techniques and organizations, the procurement of weapons, equipments and supplies and all other factors that could effect the overall "well being" of the country.

c. Timeliness: It is felt that any future war (general or local) will be fought with the weapons on hand and the initial phase will be fought with the intelligence information gathered before "D" day. Therefore, the operating agency's capability must be most responsive to requirements generated by technological advances. Past Russian technological advances surpassed all expectations, and the qualitative and quantitative aspects of their advancements are still an unknown factor. The amount of concern exhibited by the US and the rest of the world as pertains to the Russian surprise-type scientific demonstrations is offered as an example.

d. Major threats

(1) Strike capabilities have out-distanced defense capabilities. As relates to national survival, this gap must be closed. In terms of requirements; the operating agency's capability must be such that it will be responsible to this demand. From this it can be seen that the requirements for such a capability must be measured in terms of its ability to react in peacetime, in time of tension, at the imminence of hostilities, and during war. The job to be done cannot be accomplished utilizing conventional forces or capabilities. It will require a special self-sufficient and independent effort operating under the jurisdiction of a very high level government agency, on a high priority basis and with minimum political restrictions.

~~TOP SECRET~~

~~TOP SECRET~~

- 7 -

(2) The Soviet capability in the missile, atomic energy, and heavy bomber areas, constitute a major threat. The requirement for intelligence in these areas is shared by all US agencies, and the entire free world. Intelligence resulting in or leading to the successful penetration of the Soviet air defense system by friendly forces will become increasingly important as time goes on, as will the requirement to obtain and maintain missile master of battle.

6. Recommendations: It is recommended that action be taken to obtain the best available "follow-on" capability within the shortest time possible. This recommendation is made without "qualifying comments" pertaining to utilization. Whether or not the capability is used at all, or used sparingly, should not influence the decision. Factors influencing this decision are:

a. The job to be done.

b. Overall lack of information as pertains to the Russians.

c. Political restrictions vary with personnel in office, as well as with conditions (peacetime, tension, imminence of hostilities, and war).

d. The number one national intelligence objective is the warning of the imminence of hostilities. Peacetime, overflight and peripheral type of reconnaissance is one of the best single sources for this type of information. The intelligence obtained with a suitable airborne platform is unique in that it cannot be obtained in any other manner (sole source).

e. In the event of loss of existing ground monitoring facilities due to unforeseen political reversals, the "follow-on" vehicle would be the only effective collection capability available.

f. Although it is recognized that the relative merits of electronics airborne collection techniques vs. electronic ground techniques are controversial; a recent test conducted by USAFSS indicated that the airborne collection techniques are the most effective and efficient.

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Director of Operations

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